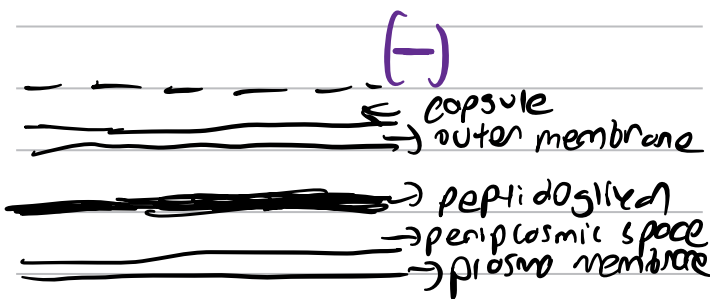
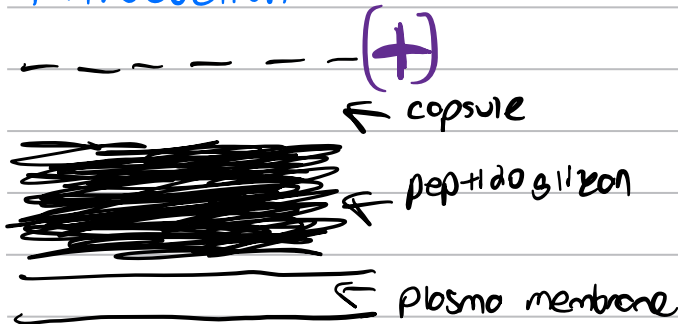
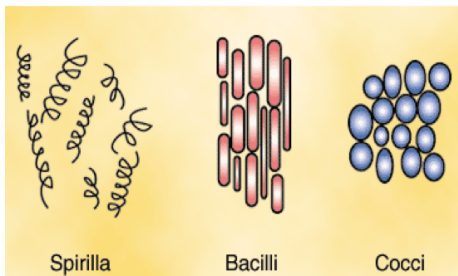
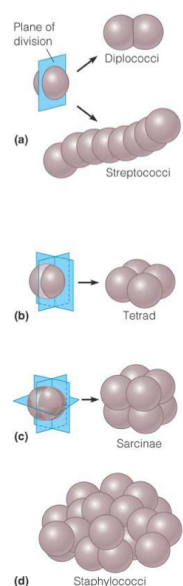
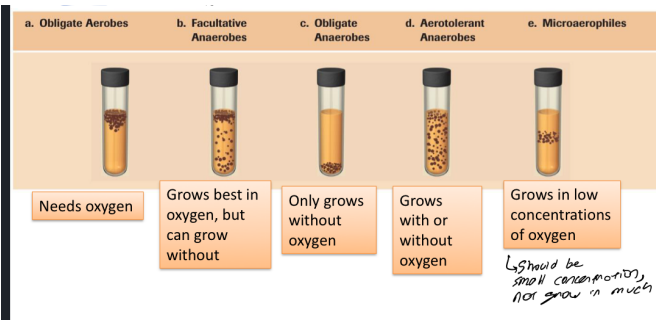


Mikrobiyoloji Komite 1

Introduction



Bacterial Metabolism



monotrichous =

lophotrichous =

amphitrichous =

peritrichous =

Bacterial Genetics

Mutations

Silent = no effect in protein

Missense = results in amino acid

substitution

Nonsense = stop codon for amino acid

Frameshift = shift in reading frame

insertion stop codon

Enzymes Used in Replication

Helicase = unzip DNA helix

Primase = synthesize RNA primer

DNA polymerase 3 = add bases to

new chain, proofreading the

chain for mistakes

DNA polymerase 1 = removing primer

closing gaps, repairing mismatch

Ligase = final binding of nicks

in DNA during synthesis

Gyrase = supercoiling

Transposons

- mobile segment of DNA

- transposition in same cell

- encode antibiotic resistance

- move btw chromosome, plasmid and

plasmid plasmid

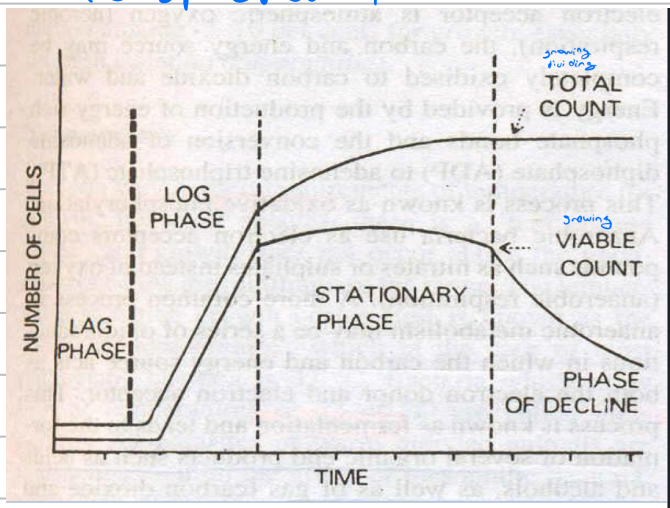
Transfer of genes

conjugation = bacterium to bacterium

transduction = cell to cell

transformation = naked DNA to cell

Bacterial Growth



Medions

peptone water bottle → liquid medium

Salmonella enriching → selective liquid med.

liquid media → blood culture

semisolid media → motile bacteria

blood → α hemolysis → partial lysis
β hemolysis → complete "
γ hemolysis → no "

Mullen Hinton → antibiotic resistance

MacConkey and EMB → inhibit G+ lactose fermenter

→ bright pink → MacConkey
→ deep purple → EMB

Lowenstein Jensen → Mycobacterium tuberculosis

Dextrose agar → culture fungi

EMB → test contamination on water

Virulence

Bacterial Pathogenesis

transmission = portal of entry

evasion = host defenses barriers

adherence = mucous membranes, pili

colonization = growth of bacteria

disease = toxin production

host responses

progression and resolution of disease

Virulence factors

1-) ability to move, like flagella

2-) surface proteins that adhere host tissues

3-) have outer capsule

4-) exotoxin and endotoxins

5-) siderophores → compete for nutrients

6-) intracellular existence

7-) biofilms

Koch Postula

How to Relate a Pathogen to a Disease Koch's Postulates

1) The organism must be found in all cases of disease but generally not in healthy animals

2) The organism must be isolated from diseased animals and grown in pure culture

3) The disease must be reproduced when the isolated organism is inoculated into susceptible animals

4) The organism must be isolated in pure culture from the experimentally infected animals.

Enzymes Produced By Bacteria

Collagenase and Hyaluronidase

↳ degrade collagen, hyaluronic

↳ allowing the bacteria to spread through dermal tissue

Coulogates

↳ accelerate formation of fibrin knot

Immunoglobulin A protease

↳ allowing organism to adhere to mucous membrane

Leukocidins

↳ destroy both neutrophils and macrophages

Kinases

↳ dissolves knots, allow escape from isolated wounds

Exotoxins and Endotoxins

Comparison of Properties		
Property	Exotoxin	Endotoxin
Source	Certain species of gram-positive and gram-negative bacteria	Cell wall of gram-negative bacteria
Secreted from cell	Yes	No
Chemistry	Polypeptide	Lipopolysaccharide
Location of genes	Plasmid or bacteriophage	Bacterial chromosome
Toxicity	High (fatal dose on the order of 1 µg)	Low (fatal dose on the order of hundreds of micrograms)
Clinical effects	Various effects (see text)	Fever, shock
Mode of action	Various modes (see text)	Includes TNF and interleukin-1
Antigenicity	Induces high-titer antibodies called antitoxins	Poorly antigenic
Vaccines	Toxoids used as vaccines	No toxoids formed and no vaccine available
Heat stability	Destroyed rapidly at 60°C (except staphylococcal enterotoxin)	Stable at 100°C for 1 hour
Typical diseases	Tetanus, botulism, diphtheria	Meningococcemia, sepsis by gram-negative rods

Important bacteria:

1. **Staphylococcus epidermidis** *S. Epidermidis* is a major inhabitant of the skin, and in some areas it makes up more than 90 percent of the resident aerobic flora
2. **Micrococcus sp.** Micrococci are not as common as staphylococci and diphtheroids
3. **Corynebacteria sp.** The term diphtheroid denotes a wide range of bacteria belonging to the genus *Corynebacterium*
4. **Mycobacterium smegmatis**

4-Normal Flora of the Human Oral Cavity

The oral flora is involved in dental caries and periodontal disease

Oral bacteria include:

1. Streptococci viridans
2. Lactobacilli
3. Staphylococci (*S. aureus* and *S. epidermidis*)
4. *Corynebacterium* sp.
5. *Bacteroides* sp.
6. *Streptococcus sanguis* (dental plaque)
7. *Streptococcus mutans* (dental plaque)
8. *Actinomyces* sp.



7-Normal Flora of the Gastrointestinal Tract (GIT)

In humans, the GIT flora are influenced by:

1. Age
2. Diet
3. Cultural conditions
4. The use of antibiotics

In breast-fed

1. **Bifidobacteria** account for more than 90% of the total intestinal bacteria. (Is a genus of gram-positive, nonmotile, often branched anaerobic bacteria)
2. Enterobacteriaceae
3. Enterococci
4. Bacteroides
5. Staphylococci
6. Lactobacilli
7. Clostridia

b) The vagina → the most important microbe is

1. *Corynebacterium* sp.
2. Staphylococci
3. Nonpyogenic streptococci
4. *Escherichia coli*
5. *Lactobacillus acidophilus* → if it is not present women open to infection
6. *Flavobacterium* sp.
7. *Clostridium* sp.
8. Streptococci viridans
9. Other Enterobacteria

Diphtheria toxin → Cytotoxin inhibit protein

Erythrogenic toxin → Synthesize

Botulinum toxin → neurotoxin prevent transmission of nerve impulses

Tetanus toxin → block relaxation of skeleton muscles

Vibrio enterotoxin → enterotoxin causes fluid and water collects

Staphylococcal enterotoxin